TFREC

Tree Fruit Research and Extension Center
## At-A-Glance

### WENATCHEE TFREC

<table>
<thead>
<tr>
<th>CROPS</th>
<th>SYSTEMS</th>
<th>RESOURCES</th>
<th>PEOPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple</td>
<td>Conventional</td>
<td>400+ acres of research orchards</td>
<td>12 faculty</td>
</tr>
<tr>
<td>Pear</td>
<td>Organic</td>
<td>USDA-ARS Postharvest Research Facility</td>
<td>27 staff</td>
</tr>
<tr>
<td>Sweet Cherry</td>
<td>New Technologies</td>
<td></td>
<td>14 post-docs</td>
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<td></td>
<td></td>
<td></td>
<td>13 grad students</td>
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</tbody>
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WSU
TFREC Faculty

Achour Amiri
Plant Pathology
Postharvest Tree Fruit Diseases

Elizabeth Beers
Entomology
Tree Fruit IPM

Tianna DuPont
ANR
Tree Fruit Extension

Kate Evans
Horticulture
Pome Fruit Breeding

David Granatstein
Emeritus
Sustainable Organic Agriculture

Lee Kalcsits
Horticulture, EC
Tree Fruit Environmental Physiology and Management

† Endowed Chair of Tree Fruit Environmental Physiology & Management
* Endowed Chair of Tree Fruit Physiology & Management
‡ Endowed Chair of Postharvest Systems
TFREC Faculty

Stefano Musacchi  
Horticulture, EC*  
Tree Fruit Physiology and Management

Tobin Northfield  
Entomology  
Tree Fruit

Louis Nottingham  
Entomology

Marcy Ostrom  
ANR/Small Farms  
Small Farms & Community Food Systems

Sara Serra  
Horticulture  
Tree Fruit Physiology and Management

Carolina Torres  
Horticulture, EC‡  
Postharvest Systems

* Endowed Chair of Tree Fruit Physiology & Management
‡ Endowed Chair of Postharvest Systems
TFREC Staff | Administration

Chad Kruger
Director

Darla Ewald
Office Manager / HR

Megan Welker
Office Assistant
TFREC Staff | Physical Plant & Farm Operations

Jerry Moreland
Facilities Manager

Trish Mulvaney
Maintenance

Micah Cawdery
Maintenance

Cameron Burt
Farm Manager

Francisco Figueroa
Columbia View Orchard

Mike Mitchell
Sunrise Orchard

Not pictured: Evan Mendonca, Sergio Alfaro-Rameriz, Daniella Reyes, and Willy Stockman
Pome Fruit Pre- and Post-Harvest Pathology

• Conduct basic and applied research on major diseases of pome fruit
• Develop solutions to enhance disease management and increase packout
• Study the epidemiology and etiology of major pathogens in orchards and storage rooms
• Use traditional and molecular approaches to understand mechanisms of fungicide resistance development in major pathogens
• Investigate the effect and impact of postharvest environments on disease development
Tree Fruit IPM

- Focus on multi-tactic IPM solutions to tree fruit pest problems to stabilize agroecosystems
- Address emerging issues with invasive species such as spotted wing drosophila and brown marmorated stink bug
- Develop and maintain integrated biological control through studies of non-target effects
- Assess impact of classical biological control agents and non-target effects on native species
- Test new candidate materials and techniques such as Sterile Insect Release and exclusion netting for potential in IPM programs
Tree Fruit Extension

- Orchard Integrated Pest Management (IPM)
- Fire Blight Management
- Quick decline, Little cherry disease, Replant disease education
- Orchard management education
Pome Fruit Breeding

- Dwarfing rootstocks for pear to facilitate efficient high-density plantings in the Pacific Northwest
- New improved apple varieties, selected for the major production regions of Washington state, and available to Washington growers.
Tree Fruit Physiology

• Apple sunburn management: evaporative cooling, netting and gene expression
• Evaluation of netting to optimize light and fruit surface temperature
• Interactions between rootstocks and the environment
• Mitigation of bitter pit in Honeycrisp
• Deficit irrigation for water management and improved fruit quality
Tree Fruit Physiology and Management

• Innovative orchard design for apple and pear suitable for mechanization and automatization.
• Evaluation of new rootstocks for apple and pear.
• Orchard management: optimization of growth, pruning, production capacity, fruit quality, harvest time in apple and pear.
• Precision crop load management in apple.
• Apple thinning with net (bee exclusion).
• Manchurian crabapple replacement: finding alternative pollinizers.
• Dry matter in apple and pear: consumer preference and willingness to pay.

Stefano Musacchi
Tree Fruit Entomology

- Applied insect ecology
- Biological control
- X Disease and vector control
- Population dynamics
- Theoretical ecology

Tobin Northfield
Tree Fruit Entomology

- Pear Integrated Pest Management
- Cultural pest controls: reflective films, and overhead washing
- Augmentation biological control of pear psylla with earwigs
- Pest management effects on insect behavior
Tree Fruit Physiology and Management

- Non-destructive dry matter assessment to sort pears and apples at harvest.
- Consumer preference and willingness to pay based on at harvest sorting pears and apples.
- Apple flower biology, pollination and fruit development.
- Photosensitive netting for apple orchard and effects on the light quality and quantity.
- New rootstocks evaluation for apple and pear orchard.
- Precision crop load management for consistent production in apple orchard.
Tree Fruit Postharvest Systems

- Effect of abiotic stress and climate on fruit quality and physiological disorders development using a system approach
- Non-destructive techniques to predict fruit quality as a sorting and predictive tool postharvest
- Handling technologies and postharvest systems from apples, pears and cherries
International Faculty, Staff & Students

REPRESENTING
Algeria
Argentina
Bangladesh
Cameroon
Canada
Chile
China
India
Indonesia
Italy
Malaysia
Mexico
New Zealand
Nigeria
Peru
South Korea
Spain
United Kingdom
United States
TFREC Graduate Students

Noah Willsea
Marcella Galeni
Andrew Griffin
Raquel Gomez
Jonathan Puglisi

Plant Pathology

Horticulture

{Department}
2020/2021 Mike and Kathy Hambelton Fellowship

Mike and Kathy Hambelton Fellowship Donors

Jonathan Puglisi
Plant Pathology

Erica Casagrande-Biasuz
Horticulture

Molly Sayles
Entomology

Marcella Galeni
Horticulture

Andrew Griffin
Horticulture

Abby Clarke
Entomology
FACILITIES AND RESOURCES

Main Campus

- 422 total acres
- 30 acre central plant
  - 4 acre research orchard
  - Research laboratories and office buildings
  - Greenhouses
  - Shop
  - Student housing
FACILITIES AND RESOURCES

Columbia View Orchard

- 92 acre research orchard located near Orondo (Douglas County)
- 46 acres shared with USDA-ARS
- Encircled by an electrified deer fence
- Home of the WA 38 Mother Tree
FACILITIES AND RESOURCES

Sunrise Research Orchard

- 300 acres (150 acres with water rights)
- 80 acres dedicated to research
- 60 acres available for lease
- Secured equipment compound with modular units for research and educational activities
- Located on WA-28 south of Rock Island Dam
- Purchased in 2006
QUICK FACTS

Washington Tree Fruit Industry

- $10B annual value
- 1/3 of fresh fruit grown in Washington for export
- ~233,400 total bearing acres of tree fruit
- ~170,000 bearing acres of apples
- Washington leads U.S. in utilized production
  - Apple (65%; 16% organic)
  - Pear (49%; 16% organic)
  - Sweet Cherry (71%; 6.7% organic)

1 2018, USDA/NASS
2 2018 Recent Trends in Certified Organic Tree Fruit in Washington State
$32M Tree Fruit Endowment

- Represents the largest single gift in WSU history
- Time-limited special project assessment from Washington tree fruit growers
- Supports the WSU Wenatchee & Prosser Research and Extension Centers
  - Endowed Chairs | $12M
  - Information & Technology Transfers | $12M
  - Research Facilities & Orchard Operations | $8M
- Partnered Management with Endowment Advisory Committee